Claims:

1. (Previously Presented) A method for finding substances which interact with the enzyme protoporphyrinogen oxidase (PPO) comprising the steps of:

   a) preparing mixtures which comprise, in various concentrations, (i) PPO, (ii) a substance which is capable of interacting with PPO and which fluoresces when exposed to suitable irradiation, and (iii) a substance to be tested, or a mixture of substances to be tested,

   b) irradiating the mixtures with plane-polarized light of a suitable wavelength which excites the fluorescent substance to emit light, and

   c) measuring the fluorescence polarization values or the anisotropy values of the light emitted,

   where a decrease in the fluorescence polarization value with an increasing concentration of the substance to be tested or of the mixture of substances to be tested indicates an interaction of one or more substances to be tested with PPO.

2. (Previously Presented) A method for assaying whether a substance interacts with the enzyme protoporphyrinogen oxidase (PPO) comprising the steps of:

   a) preparing mixtures which comprise, in various concentrations, (i) PPO and (ii) a substance which fluoresces when exposed to suitable irradiation,

   b) irradiating the mixtures with plane-polarized light of a suitable wavelength which excites the fluorescent substance to emit light,

c) measuring the fluorescence polarization values or the anisotropy values of the light emitted,

where an increase in the fluorescence polarization value with a decreasing concentration of the fluorescent substance indicates an interaction with PPO.

3. (Previously Presented) A method according to Claim 1, wherein the PPO is a plant PPO.

4. (Previously Presented) A method according to Claim 1, wherein a PPO-containing plant cell extract is employed.

5. (Previously Presented) A method according to Claim 1, wherein biochemically purified PPO from plant cell extracts is employed.

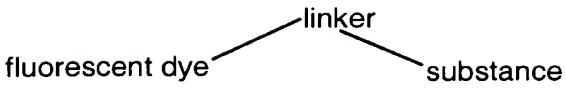
6. (Previously Presented) A method according to Claim 1, wherein recombinantly produced PPO is employed.

7. (Previously Presented) A method according to Claim 1, wherein the fluorescent substance is a substance labelled with a fluorescent dye.

8. (Previously Presented) A method according to Claim 7, wherein the fluorescent dye is fluorescein or a fluorescein derivative.

9. (Previously Presented) A method according to Claim 1, wherein the substance which is capable of interacting with PPO is a PPO ligand, a natural PPO substrate, a natural product of the PPO enzyme reaction or a herbicidally active PPO inhibitor.

10. (Previously Presented) Method according to Claim 1, wherein the fluorescent substance has the following structure:



where

"linker" represents a hydrocarbon chain which is in each case straight-chain or branched, in each case saturated or unsaturated, in each case optionally substituted, in each case linked at one end to the substance and at the other end to the fluorescent dye, it being possible for this hydrocarbon chain to contain in each case at the beginning or at the end or within the chain one or more of the following hetero components:

Q^1, CQ^2, CQ^2-Q^1, Q^1-CQ^2, Q^1-CQ^2-Q^1, SO, SO_2

where in each case Q^1 and Q^2 represent O, S or NH,

or represents a carbocyclic or heterocyclic group which is in each case saturated or unsaturated, in each case optionally substituted and linked at one end to the substance and at the other end to the fluorescent dye, and

"substance" represents a substance which is capable of interacting with PPO.

Claims 11-22 (cancelled)

23. (Previously Presented) An assay system comprising

a) containers with mixtures as defined in Claim 1,

b) a device for irradiating the mixtures of plane-polarized light of a wavelength which excites the fluorescent substance to emit light, and

c) a device for measuring the fluorescence polarization values or the anisotropy values of the light emitted.

Claims 24-25 (cancelled).

26. (Previously Presented) A method according to Claim 2, wherein the PPO is a plant PPO.

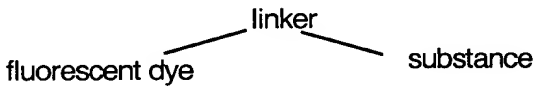
27. (Previously Presented) A method according to Claim 2, wherein a PPO-containing plant cell extract is employed.

28. (Previously Presented) A method according to Claim 2, wherein biochemically purified PPO from plant cell extracts is employed.

29. (Previously Presented) A method according to Claim 2, wherein recombinantly produced PPO is employed.

30. (Previously Presented) A method according to Claim 2, wherein the fluorescent substance is a substance labelled with a fluorescent dye.

31. (Previously Presented) A method according to Claim 2, wherein the fluorescent substance has the following structure:



wherein "linker" represents a hydrocarbon chain which is in each case straight-chain or branched, in each case saturated or unsaturated, in each case optionally substituted, in each case linked at one end to the substance and at the other end to the fluorescent dye, it being possible for this hydrocarbon chain to contain in each case at the beginning or at the end or within the chain one or more of the following hetero components:

Q^1, CQ^2, CQ^2-Q^1, Q^1-CQ^2, Q^1-CQ^2-Q^1, SO, SO_2

wherein Q^1 and Q^2 represent O, S or NH, or represents a carbocyclic or heterocyclic group which is in each case saturated or unsaturated, in each case optionally substituted and linked at one end to the substance and at the other end to the fluorescent dye, and

"substance" represents a substance which is capable of interacting with PPO.

Claims 32-35 (cancelled)

36. (Previously Presented) An assay system comprising

a) containers with mixtures as defined in Claim 2,

b) a device for irradiating the mixtures of plane-polarized light of a wavelength which excites the fluorescent substance to emit light, and

c) a device for measuring the fluorescence polarization values or the anisotropy values of the light emitted.

Respectfully submitted,

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